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BOTANY.—*Revision of Ichthyomethia, a genus of plants used for poisoning fish.* S. F. BLAKE, Bureau of Plant Industry.

The genus *Ichthyomethia*, belonging to the tribe Dalbergieae of the family Fabaceae, is of economic importance among the aborigines of tropical America as one of the plants commonly used as a fish poison. Its use for this purpose in Jamaica, where it is called dogwood, was so well described by Patrick Browne¹ that it is only necessary to cite his quaint account.

The bark of the root of this tree is used for the same purposes, and with the same effects, as the leaves and branches of Surinam poison, already described: it is pounded, and mixed with the water in some deep and convenient part of the river, or creek, etc., from whence it may spread itself more diffusively around; and in a few minutes after it is well mingled, you'll see the fish, that lay hitherto hid under the neighboring rocks, or banks, rising to the surface, where they float as if they were dead; in which situation they continue for a considerable time; but most of the large ones that are left, recover after a time; while the smaller fry are all destroyed, and float upon the surface, for some days after. The eel is the only fish I have observed, that could not be intoxicated with the common doses of this bark, though it affects it very sensibly; for the moment the particles spread where it lies, it moves off, and swims with great agility through the water. I have sometimes seen them chased to and fro, in this manner, for some minutes, without being any ways altered.

The tree is generally considered as one of the best timber-trees in the island. The wood is very hard, and resinous; and lasts almost equally in or out of water. It is of light brown color, coarse, cross-grained, and heavy.

The bark of the roots of the genus has found some application in eclectic medicine, under the name *Piscidia* or *Piscidia bark*,

¹ Nat. Hist. Jam. 296. 1756.

but it is not listed in the United States Dispensatory. The active principle, according to Hart as quoted by Felter and Lloyd,² is a neutral body, piscidin ($C_{29}H_{24}O_8$), which has narcotic and analgesic properties. It has been used for alleviating insomnia and neuralgia, for allaying spasms, and for similar purposes. Experimentally it has been found to bring about death in animals by causing heart failure or by arresting respiratory action.

Although this genus has generally been known under the name *Piscidia*, given it by Linnaeus in 1759, it is necessary under the American Code of Botanical Nomenclature to adopt for it the name *Ichthyomethia*, published by Patrick Browne in 1756, with a reference to the original species, *Erythrina piscipula* L.

In addition to the original species, *Ichthyomethia piscipula* (L.) Hitchc. (*Erythrina piscipula* L., 1753; *Piscidia erythrina* L., 1759), and some species wrongly ascribed to the genus by early authors, four species have been described: *Piscidia Americana* Moc. Sessé, *P. mollis* Rose, *P. cubensis* Urban, and *Ichthyomethia havanensis* Britton & Wilson. A sixth species is *Derris grandifolia* Donn. Smith, the fruit of which, unknown to the describer of the species, shows it to be a member of this genus. In addition to these species, study of the specimens in the National Herbarium, supplemented by material from the New York Botanical Garden and the Gray Herbarium, has shown the existence of three new species, closely related to *I. piscipula* but distinguished by constant characters and definite geographical ranges. My thanks are due to the curators of the herbaria mentioned for the loan of the material.

Of the eight species here recognized, three (*I. grandifolia*, *I. mollis*, and *I. cubensis*) are very distinct in characters of foliage and pubescence. The other five form a closely related group centering around the original species, *I. piscipula*. In making out the characters which distinguish these species, and in correlating them with distribution in definite floristic regions, I am indebted for advice and assistance to Mr. William R. Maxon. The first of these, *I. piscipula*, definitely known as a native only

² King's Amer. Dispensatory ed. XI. (3d revision) 2: 1510. 1900.

of Jamaica, is distinguished by having the leaves evenly but not densely short-pilose beneath with spreading-ascending, usually rufescent hairs, while in the other four species they are merely puberulous to strigose. In two of these, *I. havanensis* and *I. communis*, the leaves are densely puberulous beneath with incurved or ascending hairs, which are more numerous along the veins and veinlets and coincide with them in direction. In the remaining two species, *I. americana* and *I. acuminata*, the leaves are distinctly strigose or strigillose beneath, and the hairs, except along the costa and the primary lateral veins, do not follow the direction of the nervation, but all point toward the margin of the leaf; in consequence of which the hairs which arise from the secondary and tertiary veinlets diverge from their veinlets at approximately a right angle, and those which arise from the surface below and near the veinlets lie across the latter transversely. Associated with these characters of pubescence is a difference in the ceraceous covering of the under leaf surface. In *I. communis* the waxy covering is comparatively thick and is divided by the ultimate veinlets into definitely raised areoles. In most of the other species it is thinner and flatter and, owing to the weaker development of the veinlets, does not have the same areolate appearance.

Piscidia carthagenensis, Jacq.,³ briefly described by Jacquin from fruiting material collected at Cartagena, was said to differ from *P. erythrina* L. in its obovate, much larger leaflets. No material from Colombia has been seen by the writer, and Jacquin's account is so incomplete that it is necessary for the present to leave the identity of the species in doubt. It is presumably most closely related to *I. acuminata*, and may prove to be identical. DeCandolle's account of *P. carthagenensis* in the *Prodromus*⁴ evidently applies in part to *Ichthyomethia piscipula* and perhaps to other species not then distinguished.

Loefling's *Piscipula erythrina*,⁵ incompletely described from trees found by Loefling in northeastern Venezuela, is perhaps

³ Enum Pl. Carib. 27. 1760; Stirp. Amer. 210. 1763.

⁴ Prodr. 2: 267. 1825.

⁵ It. Hisp. 275. 1758.

identical with Jacquin's *P. carthagenensis*. As Loeffling gives no account of the pubescence of the leaves, it is impossible in the absence of specimens to be certain of the identity of his plant.

The only South American material of the genus in the herbaria which the writer has examined consists of fruits in the National Herbarium collected at Río Macara, Ecuador, altitude 455 to 610 meters, April, 1910, by C. H. T. Townsend (no. 849), and leaves in the Gray Herbarium collected on Chatham Island, Galápagos Islands, 1899, by Snodgrass and Heller (no. 503). Both these collections are too imperfect for specific determination.

Ichthyomethia P. Br. Nat. Hist. Jam. 296. 1756.

Piscipula Loeffl. It. Hisp. 275. 1758.

Piscidia L. Syst. ed. 10. 1155. 1759.

Trees or shrubs, not climbing; leaves odd-pinnate, the leaflets opposite; flowers in lateral panicles, appearing before the leaves; calyx campanulate, obscurely 2-lipped, the upper lip emarginate, the lower 3-lobed, the teeth deltoid; flowers rosy or white and red, rarely yellowish white, vexillum suborbicular or oval-obovate, emarginate, short-clawed; wings falcate-oblong, long-clawed, adherent to keel near middle, the limb auriculate above at base; keel obtuse, its petals long-clawed, their limbs united near middle for about one-third their length, auriculate-sagittate on upper side at base; stamens 10, the vexillar one free at base for one-quarter to one-half its length, or rarely free throughout; ovary sessile, many-ovulate; style filiform, incurved, glabrous, with a small terminal stigma; legume indehiscent, firm, with linear body, broadly or narrowly 2-winged on each suture, stipitate, 1 to 6-seeded, in age tending to break transversely between the seeds.

Type species, *Erythrina piscipula* L.

KEY TO SPECIES

Wings as broad as or much broader than the body of the fruit; leaflets 3 to 12 cm. long.

Leaves very densely and softly cinereous-tomentulose or pilose beneath; vexillum glabrous (so far as known); vexillar stamen entirely free (so far as known).

Leaves densely tomentulose beneath.....1. *I. grandifolia*.

Leaves densely short-pilose beneath.....2. *I. mollis*.

Leaves puberulous, strigose, or short-pilose beneath; vexillum densely pubescent; vexillar stamen free for one-fourth to one-half its length.

Leaves puberulous to strigose beneath.

Leaves densely incurved-puberulous or ascending-puberulous beneath, the hairs more numerous along the veinlets and parallel with them; stipe of fruit equaling or slightly exceeding the calyx.

- Low shrub; petiole and rachis spreading-puberulous; leaflet prominulous-reticulate beneath; fruit 1.2 to 3.5 cm. long3. *I. havanensis*.
 Tree; petiole and rachis strigillose or appressed-puberulous; leaflets not prominulous-reticulate beneath; fruit 2.5 to 7.5 cm. long4. *I. communis*.
 Leaves strigose or strigillose beneath, the hairs not more numerous along the veinlets, crossing them transversely; stipe of fruit much exceeding the calyx.
 Lobes of lower lip of calyx obtuse or rounded5. *I. americana*.
 Lobes of lower lip of calyx short-acuminate6. *I. acuminata*.
 Leaves short-pilose beneath with spreading-ascending hairs7. *I. piscipula*.
 Wings much narrower than the body of the fruit; leaflets 1 to 2 cm. long8. *I. cubensis*.

1. *Ichthyomethia grandifolia* (Donn. Smith) Blake.

Derris grandifolia Donn. Smith, Bot. Gaz. 56: 55. 1913.

Tree, with stout branches; shoots of the year cinereous-tomentulose, the older branches glabrate; leaves 7 to 11-foliolate, 18 to 33 cm. long; petiole, rachis, and petiolules densely cinereous- or sordid-tomentulose with crisped spreading hairs; leaflets 5.5 to 10 cm. long, 3 to 6.5 cm. wide, oval or the lowest ovate, broadly rounded, mucronulate, rounded at base, thick, above dull green, densely crisped-pilosulous, beneath densely cinereous-tomentulose with crisped spreading hairs, these in youth concealing the secondary veins; panicles cylindric, dense, 10 to 15 cm. long, sordid-tomentulose; pedicels 1.5 to 4.5 mm. long; calyx 7 to 8 mm. long, densely sordid-pilosulous, the lobes of lower lip deltoid-triangular, short-acuminate; vexillum oval-obovate, glabrous, 10 mm. long; alae 12 mm. long (the claws 5.5 mm. long), the limb ciliate on lower edge toward base; keel 13.5 mm. long, glabrous; vexillar stamen entirely free; fruit 4 to 9 cm. long, 2.5 to 5 cm. wide, 3 to 5-seeded, densely sordid-pilosulous, the wings usually not divided, as broad as or broader than the body, the stipe exceeding the calyx by 1 to 3 mm.

TYPE LOCALITY: Cerro Gordo, Guatemala.

SPECIMENS EXAMINED:

PUEBLA: Zapotitlán, 1908, *Purpus* " = 2648."

OAXACA: Near Dominguillo, altitude 1370 to 1675 meters, 1894, *Nelson* 1826.

GUATEMALA: Volcán Imay, Dept. Jalapa, altitude 1525 meters, 1908, *Kellerman* 8048 (N. Y. Bot. Gard.). Cerro Gordo, Dept. Santa Rosa, altitude 1100 meters, August, 1892, *Heyde* & *Lux* 3709 (type collection).

This species departs from other members of the genus in its glabrous banner and its free vexillar stamen. The flowers of the next species,



I. mollis, have not yet been collected, but from the agreement in other features it is probable that they will show the same peculiarities. The fruit of both species is precisely that of the type species of *Ichthyomethia*, and the character of the stamens is known to vary in the same way in related genera of this group.

2. *Ichthyomethia mollis* (Rose) Blake.

Piscidia mollis Rose, Contr. U. S. Nat. Herb. 1: 98. 1891.

Tree, 3 to 8 meters high; branches rather slender, softly cinereous-tomentulose, in age glabrate; leaves 7 to 13-foliolate, 8 to 20 cm. long; petiole, rachis, and petiolules densely cinereous-tomentulose; leaflets 3 to 7.8 cm. long, 2 to 4 cm. wide, oval to ovate, acute to rounded, at base rounded, whitish green on both sides, above densely pilosulous with crisped hairs, beneath densely and softly short-pilose with ascending hairs, in age prominulous-reticulate; fruit 2.5 to 5 cm. long, 3.5 to 4.5 cm. wide, 1 to 3-seeded, densely cinereous-puberulous, the wings much wider than the body of the fruit, sometimes split in age.

TYPE LOCALITY: Ridges about Alamos, Sonora.

SPECIMENS EXAMINED:

SONORA: Alamos, 1890, *Palmer* 355 (type collection). Dry hills, Alamos, 1910, *Rose, Standley, & Russell* 12906, 13515. Near Torres, 1903, *Coville* 1659.

This species is distinguished from *I. grandifolia* by having its leaflets pilose rather than tomentose beneath. The flowers have not yet been collected. The plant bears the vernacular name "palo blanco." One of the specimens collected by Rose, Standley, and Russell, under their number 12906, is remarkable in having dull green, rather sparsely pilosulous leaves. It is doubtless a sucker growth or young shoot of the plant, and is not properly to be taken as indicating variation in the adult leaves, all those examined being very constant in both color and pubescence.

3. *Ichthyomethia havanensis* Britton & Wilson, Bull. Torrey Club 44: 34. 1917.

Shrub, 2 meters high; branchlets sparsely puberulous, in age fuscous, glabrate; leaves 9-foliolate, 10 cm. long; petiole and rachis rather densely sordid-puberulous with spreading hairs; leaflets (immature) 3.5 cm. long, 1.5 cm. wide, elliptic to oblong-oval, obtuse to rounded, mucronulate, at base, cuneate-rounded, above dull green, spreading-puberulous, glabrescent, beneath paler, prominulous-reticulate, densely puberulous with ascending hairs somewhat more numerous along the veins; calyx 5 mm. long, densely rufescent-strigillose, the teeth deltoid, obtuse; fruit, 1.2 to 3.5 cm. long, 2 to 2.8 cm. wide, 1 to 3-seeded, appressed-puberulous, the wings much wider than the body, usually undulate-divided.

TYPE LOCALITY: Near Cojimar, Havana, Cuba.

SPECIMENS EXAMINED:

CUBA: Thickets not far from Cojimar, May 14, 1915, *León & Roca* 6194 (type; N. Y. Bot. Gard.).

This species, of which only the type, in fruit and young leaf, has been examined, is distinguished from the next by its smaller fruit and smaller leaflets, these prominulous-reticulate beneath, as well as by the pubescence of the rachis and petiolules.

4. *Ichthyomethia communis* Blake, sp. nov.

Tree, 20 meters high or less; branchlets strigillose, soon glabrate; leaves 7 or 9-foliolate, 12 to 22 cm. long; petiole and rachis sordid-strigillose or appressed-puberulous, sometimes glabrate in age; leaflets 4 to 12 cm. long, 2 to 5 cm. wide, oblong or elliptic to obovate-oval, acute or short-pointed, rounded to cuneate at base, above green, appressed-puberulous, at length glabrate, beneath pale, not prominulous-reticulate, densely incurved-puberulous, the hairs more numerous along the veins; panicles 3 to 9 cm. long, many-flowered, often branched from base, finely griseous-puberulous; pedicels 2 to 6 mm. long; calyx 4.5 mm. long, densely cinereous-puberulous; the teeth of lower lip broadly deltoid, obtuse or rounded; vexillum 12.5 mm. long, suborbicular, densely cinereous-pubescent on back; alae about 15 mm. long (the claws 7 mm. long), the lamina sparsely pubescent; keel 12 mm. long (the claws 6.5 mm. long), the petals pubescent below, the claws ciliate beneath above the middle; vexillar stamen free for one-fourth to one-half its length; fruit 2.5 to 7.5 cm. long, 2.8 to 4 cm. wide, 1 to 6-seeded, cinereous-puberulous, especially on the body, the wings much wider than the body, usually undulate-divided, the stipe equaling the calyx or exceeding it by only 6 (rarely 9) mm.

Type in the U. S. National Herbarium, no. 41958, collected in forests on coral soil, Ramrod Key (flowers), and on Jewfish Key, Florida (leaves and fruit), May and July, by A. H. Curtiss (no. 685).

OTHER SPECIMENS EXAMINED:

FLORIDA: Miami, 1877, *Garber*. Punta Rassa, Lee County, 1900, *Hitchcock* 76; 1916, *Miss J. P. Standley* 257. Marco, Lee County, 1916, *P. C. Standley* 12732. White Horse Key, and Key West, 1891, *Simpson* 234. Palm Cape, *Chapman* 34.

TAMAULIPAS: Tampico, 1910, *Palmer* 510.

SAN LUIS POTOSÍ: Limestone hills, Rascón, 1892, *Pringle* 4110.

VERACRUZ: Pueblo Viejo, near Tampico, 1910, *Palmer* 541 (N. Y. Bot. Gard.).

YUCATÁN: Mérida, 1865, *Schott* 260. Sisal, 1916, *Gaumer & Sons* 23219. Without definite locality, 1895, *Gaumer* 524.

HONDURAS: Ruatan Island, 1886, *Gaumer* 154.

CUBA: Manzanillo, 1912, *Shafer* 12349. Ensenada de Mora, Oriente, 1912, *Britton, Cowell, & Shafer* 12926 (N. Y. Bot. Gard.).

This species, the commonest and most widely distributed of the genus, has not previously been distinguished from *I. piscipula*. It is readily separated, however, by the leaves, which in *I. communis* are densely incurved-puberulous beneath, with the hairs along even the ultimate veinlets parallel to the latter. In *I. piscipula* the leaves are short-pilose with spreading-ascending hairs beneath, and the hairs along the veinlets do not coincide with them in direction but lie across them transversely.

I. communis is called "haabí" by the Mayas of Yucatán, and "chijol" by the Huastecan Indians of Tamaulipas and Veracruz.

5. *Ichthyomethia americana* (Moc. & Sessé) Blake.

Piscidia americana Moc. & Sessé, Pl. Nov. Hisp. 116. 1887.

Tree; branchlets appressed-puberulous, soon glabrate; leaves 9 to 13-foliolate, 12 to 20 cm. long; petiole and rachis appressed-pubescent, glabrescent, leaflets 4 to 8 cm. long, 1.7 to 4 cm. wide, oval-oblong or elliptic-oblong or the terminal one obovate-oval, rounded or obtuse, sometimes acute, rounded at base, pergamentaceous, above light green, glabrous, beneath pale, evenly but not densely short-strigose, the hairs on the costa and primary veins appressed to them, those on the secondary and tertiary veinlets and on the surface directed toward margin of leaf, thus crossing the veinlets nearly at a right angle, and not more numerous along than between them; panicles 8 to 24 cm. long, strigillose; pedicels 2 to 7 mm. long; calyx 6 to 7 mm. long, cinereous-puberulous with appressed hairs, the lobes of lower lip deltoid-ovate or broadly deltoid, slightly overlapping near base, obtuse or rounded, rarely acutish at tip; vexillum 15 mm. long, densely cinereous-puberulous dorsally, in youth subsericeous; alae 15.5 mm. long (the claws 7 mm. long), the laminae sparsely puberulous toward base; keel 15 mm. long (the claws 7 mm. long), the petals puberulous below; vexillar stamen free for one-third its length; fruit 1.5 to 7.5 cm. long, 1.8 to 4.3 cm. wide, 1 to 6-seeded, appressed-puberulous, the glabrescent wings much wider than the body, often undulate-divided, the stipe exceeding the calyx by 6 to 12 mm.

TYPE LOCALITY: Apatzingan, Michoacán, Mexico.

SPECIMENS EXAMINED:

MICHOACÁN: Hacienda Guadalupe, near Río Balsas, 1903, *Nelson* 6969. Nusco (Michoacán or Guerrero), 1899, *Langlassé* 936.

GUERRERO: La Junta, 1903, *Nelson* 6991.

GUATEMALA: Naranjo, altitude 90 meters, 1892, *J. D. Smith* 2815.

This species is called "tatzungo" or "zatzumbo" by the Tarascan Indians of Michoacán, according to Mociño and Sessé. In Guerrero it is known by the native name "cocuile" and the Mexican names "colorín de peces" and "matapez." Although there is little in the description

of Mociño and Sessé to differentiate this species, its identity is clear from the locality.

6. *Ichthyomethia acuminata* Blake, sp. nov.

Tree; branchlets strigillose, soon glabrate; leaves 7 to 11-foliolate, 17 to 30 cm. long; petiole and rachis strigillose, glabrescent; leaflets 4 to 13 cm. long, 2.2 to 7 cm. wide, oval to ovate-oval, or the terminal one obovate-oval or rarely suborbicular, obtuse or rounded, rarely short-pointed, rounded at base, pergamentaceous, above light or dark green, glabrous or essentially so, beneath paler, evenly but not densely strigose or strigillose, the hairs lying across the prominent secondary and tertiary veins and not more numerous along them than between them; panicles 10 to 30 cm. long, strigillose; pedicels 4 to 8 mm. long; calyx 5 to 6 mm. long, densely cinereous-strigillose, the lobes of lower lip deltoid, acute or acuminate; flowers "pink;" vexillum 13 to 15 mm. long, densely cinereous-strigose dorsally, in youth subsericeous; alae 15 to 18 mm. long (the claws 6.5 to 8 mm. long), the laminae sparsely pubescent; keel 14 mm. long (the claws 6 mm. long), the petals pubescent below, the claws ciliate below above the middle; vexillar stamen free for one-quarter to one-half its length; fruit 2 to 8.5 cm. long, 2.5 to 4 cm. wide, 1 to 5-seeded, strigillose, the wings much wider than the body, often undulate-divided, the stipe exceeding the calyx by 8 to 13 mm.

Type in the U. S. National Herbarium, no. 639557, collected in Antigua, Lesser Antilles, February 4-16, 1913, by J. N. Rose, W. R. Fitch, and P. G. Russell (no. 3419).

OTHER SPECIMENS EXAMINED:

PORTO RICO: Playa de Fajardo, 1913, *Britton & Shafer* 1575. Punta Guaniquilla, 1915, *Britton, Cowell, & Brown* 4576.

CULEBRA: Culebra, 1906, *Britton & Wheeler* 62.

VIEQUES ISLAND: Punta Arenas to Boca Quebrada, 1914, *Shafer* 2912.

TORTOLA: Road Town to Sea Cow Bay, 1913, *Britton & Shafer* 684.

ST. CROIX: Christiansted, 1913, *Rose, Fitch, & Russell* 3579. Without definite locality, 1896, *Ricksecker* 320.

ST. JAN: Bethania, 1913, *Britton & Shafer* 336.

MONTSERRAT: Without definite locality, 1907, *Shafer* 462.

GUADELOUPE: Without definite locality, altitude 250 meters or less, 1892, *Duss* 2662.

BARBADOS: Dover or Constitution Hill, Farley Hill, 1895, *Waby* 83.

TOBAGO: Scarborough, 1914, *Broadway* 4808.

This species and the preceding (*I. americana*) are distinguished from the other species of the *I. piscipula* type by the character of their pubescence and by the long stipe of the fruit. They are distinguished from one another chiefly by the shape of the lower calyx lobes, which are acute or short-acuminate in the present plant and taper from the

base, while in *I. americana* they are obtuse or rounded, or rarely slightly acutish at the extreme tip.

I. acuminata is known as "bois énivrant" and "bois à énivrer" in the French Islands of the Lesser Antilles, and as "ventura" in Porto Rico.

7. *Ichthyomethia piscipula* (L.) Hitchc.; Sarg. Gard. & For. 4: 472. Oct. 1891.⁶

Erythrina piscipula L. Sp. Pl. 2: 707. 1753.

Piscidia erythrina L. Syst. ed. X. 1155. 1759.

"*Piscidia inebrians* Medic. Vorles. Churpf. Phys. Ges. 2: 394. 1787."

"*Piscidia toxicaria* Salisb. Prodr. 336. 1796."

Piscidia piscipula Sarg. Gard. & For. 4: 436. 1891.

Tree, 12 meters high or less; branchlets rufescent-strigillose, glabrate; leaves 7-foliolate, 22 to 26 cm. long; petiole and rachis rufescent-strigose or strigillose; leaflets 5.5 to 11.5 cm. long, 4.5 to 7 cm. wide, oval or obovate-oval, rounded or short-pointed, at base rounded to slightly cordate, pergamentaceous, above deep green, strigillose-puberulous, glabrate, beneath slightly paler, prominulous-reticulate, rather densely short-pilose with spreading-ascending, usually somewhat rufescent hairs, these somewhat more numerous and more or less appressed along the costa and primary veins, those along the veinlets crossing them transversely and not more numerous than on the surface between them; panicles numerous, 5 to 16 cm. long, strigillose, much branched; pedicels 4 to 7 mm. long; calyx 5.5 to 6 mm. long, densely cinereous-strigillose, the lobes of lower lip deltoid, the lateral ones broadly rounded or obtuse, the middle one acute or acutish; corolla rosy or "white and red;" vexillum 13 mm. long, densely strigillose dorsally, in youth subsericeous; alae 13.5 mm. long (the claws 6 mm. long), the lamina sparsely pubescent along midline; keel 12 mm. long (the claws 5.5 mm. long), the petals pubescent and short-ciliate below, their claws short-ciliate below above the middle; vexillar stamen free for one-fourth its length; fruit 2.5 to 7 cm. long, 2.5 to 4 cm. wide, 1 to 6-seeded, cinereous-pubescent especially on the body, the wings much wider than body, often undulate-divided, the stipe exceeding calyx by 2 to 6 mm.

TYPE LOCALITY: "In America calidiore." Linnaeus's references all relate primarily to Jamaica.

SPECIMENS EXAMINED:

JAMAICA: Morant Bay, 1850, *March* (N. Y. Bot. Gard.). Berwich Hill, altitude 760 meters, 1899, *Harris* 7708. Hope Grounds, altitude 640 meters, 1903, *Harris* 8518 (N. Y. Bot. Gard.). Great Goat Island, 1906, *Harris* 9221. Vicinity of Kingston, 1910, *Brown* 364 (N. Y. Bot. Gard.).

The use of this species by the natives of Jamaica as a fish poison was known to many of the older writers. The species was apparently

⁶ This combination was also published in November, 1891, by Kuntze (Rev. Gen. 1: 191).

first listed by Hermann,⁷ in 1689, as "Coral arbor polyphylla non spinosa." Sloan,⁸ in 1696, gave a long list of trees, mentioned by still older writers and travellers as fish poisons, which he doubtfully referred to this species. Ray,⁹ in 1704, gave a good description of the plant and mentioned its use. A figure of the leafless flowering branch and of a portion of the fruit, with an account of this species and of other fish poisons, was also given in Sloane's Natural History of Jamaica.¹⁰

Ichthyomethia piscipula is readily distinguished by the pubescence of its leaves, and is probably confined as a native to Jamaica, where it is known as "dogwood." In the National Herbarium is a sheet from Key West, collected in 1896 by A. H. Curtiss (no. 5656), and another collected in Florida in 1877 by Garber. It is probable that both these specimens were taken from cultivated trees.

8. *Ichthyomethia cubensis* (Urban) Blake.

Piscidia cubensis Urban, Symb. Antill. 7: 229. 1912.

Shrub, 1 to 1.3 meters high; young branches greenish, densely rufescent-strigillose, the older branches gray, lenticellate, glabrate; leaves 5 to 9-foliolate, 2.5 to 4.5 cm. long; petiole (3 to 7 mm. long), rachis, and petiolules (1 mm. long) densely rufescent-strigillose; leaflets 1 to 2 cm. long, 6 to 11 mm. wide, oval to oblong, emarginate, apiculate, at base rounded to subcordate, coriaceous, prominulous-reticulate beneath, above light green, lucid, sparsely strigillose toward margin or glabrous, beneath obscurely strigillose chiefly along the veins; panicles rufescent-strigillose, 2 to 2.5 cm. long; pedicels 2 to 4 cm. long; calyx rufescent-strigillose, 4 mm. long, the lobes of lower lip deltoid, broadly rounded; corolla "pink or white" or "yellowish white;" vexillum 12.5 mm. long, subsericeous-strigose when young; lateral petals 13 mm. long (the claws 7 mm.), the limbs sparsely pubescent at base, sparsely ciliate at apex; keel 12.5 mm. long, (the claws 6.5 mm.), the limbs of the petals sparsely pubescent below toward base; vexillar stamen free for one-third its length; fruit linear, straightish, rufescent-strigillose, sometimes constricted between the seeds, 1 to 6-seeded, 2 to 4.8 cm. long, 5 to 7 mm. wide; wings 4, only 1 mm. wide; stipe equaling calyx; seeds olive-fusous, 4.8 mm. long.

TYPE LOCALITY: Riverside to Minas, Camaguey, Cuba.

SPECIMENS EXAMINED:

CUBA: Dry savanna, Riverside to Minas, Camaguey, April 1, 1909, *Shafer* 1171 (type collection; N. Y. Bot. Gard.). Rocky soil, Palm Barren, Santa Clara, March, 1911, *Britton & Cowell* 10179 (N. Y. Bot. Gard.). Rocky sides of arroyo, Palm Barren, April, 1912, *Britton & Cowell* 13293 (N. Y. Bot. Gard.).

⁷ Par. Bat. Prodr. 328. 1689.

⁸ Cat. Pl. Jam. 143. 1696.

⁹ Hist. Pl. 3 (lib. xxxi.): 108. 1704.

¹⁰ Voy. Jam. 2: 39. *pl.* 176. *f.* 4-5. 1725.

This very distinct species was described by Urban from Shafer's nos. 1171 and 1549, of which the former is here selected as type. Urban gives the maximum size of the leaflets as 2.5 cm. long, and 1.7 cm. wide, and the fruit as having wings up to 2 mm. broad.

Although the fruit of this species is very different in appearance from that of the other members of the genus, owing to the great reduction of the wings, the difference is only a comparative one. In its floral structure *I. cubensis* agrees precisely with other members of the genus, and the morphology of the fruit is the same.

ELECTRICITY.—*Methods of measuring conductivity of insulating materials at high temperatures.* F. B. SILSBEE and R. K. HONAMAN, Bureau of Standards.

The purpose of this paper is to describe some measurements carried out at the Bureau of Standards during the past two years, on the resistance of various insulating materials at high temperatures. This work was undertaken with a view to studying the relative merits of various insulators for use in spark plugs, and in particular to assist the Ceramic Laboratory of the Bureau in developing improved porcelain bodies for this purpose. The method finally adopted, as a result of this work, for the comparative testing of materials is described elsewhere.¹ The present paper will be confined to a description of the various phenomena observed in the experiments which led to the method finally adopted.

The electrical and thermal conditions under which a spark plug is required to operate differ considerably with the type of gasoline engine used. Measurements with imbedded thermocouples have shown that the temperature of the body of the insulator within the metal shell seldom exceeds 250° C. in water-cooled engines. The tip of the inner end, however, may reach temperatures as high as 900 to 1000° C. It therefore appeared desirable to study the resistivity of the specimens in the range of temperature between 200 and 900° C.

The electrical stresses applied to a spark plug insulator by the average magneto or battery coil ignition system used for firing gasoline engines, are quite peculiar and difficult to duplicate in

¹ Report of the National Advisory Committee for Aeronautics, 1918.